



# PATENT SPECIFICATION

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(Under Section 6 (1) (a) of the Patents &c. (Emergency) Act, 1939, the proviso to Section 91 (4) of the Patents and Designs Acts, 1907 to 1946, became operative on Jan. 31, 1947).

Index at Acceptance :—Class 9 (i), A2(d : h).

## COMPLETE SPECIFICATION.

### Improvements in and relating to Projectiles.

We, LUMALAMPAN AKTIEBOLAG, a Company organized under the Laws of Sweden, of Södra Hammarbyhamnen, Stockholm 20, Sweden, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement :

Small calibre projectiles usually are provided with an outer casing enclosing the core. During the assembling the core is pushed by means of a plunger to a certain depth into the outer casing. As a rule the core is then required to be so dimensioned as to fill out completely the outer casing. Should the core be too large, excessive pressure will easily result in deforming the outer casing thereby having a tendency for it to become jammed in the die used for assembling the projectile. For this reason narrow tolerances have to be applied in the manufacture of outer coatings and other parts for projectiles. The task is difficult, however, particularly where armour-breaking projectiles with hard-alloy cores are concerned, because in a large-scale manufacture of such cores, due to the sintering process involved, the maintenance of very exact dimensions is most toilsome and uneconomical. Projectiles according to the British Patent Application No. 9933/45 (Serial No. 592,538) embody an attempt at eliminating the disadvantages of deviations from the exact dimensions of the core by guiding the core only at its front and rear parts by means of two cones.

The present invention relates to a device for projectiles having an outer casing and being, for example, of the type described in the British Patent Application mentioned above, in which the outer casing encloses a core and a supporting body for this core. The projectile chosen for an example consists of a comparatively short and thick core inserted in an outer casing and with a supporting body termed "shoe" placed behind it. According to the invention, such a supporting body consists of a material which is soft in relation to the core material and shaped with such cavities as will ensure the required degree of compressibility to

afford compensation, when the projectile is being assembled for reasonable variations from the dimensions prescribed as normal for the parts. The supporting body may consist of aluminium.

The invention is illustrated by the accompanying drawing. Figure 1 shows a section of a supporting body or shoe of soft material intended to be placed behind the core of an armour-breaking projectile. Figure 2

shows, in section, such a complete projectile. The supporting body shown in Figure 1, which also serves as a centering medium for the rear part of the core in the outer casing, is provided with a conical recess 1 in its front end. This recess is designed with an additional excavation 3, thus leaving only an edge of the bottom of the recess 1 to rest against the back wall of the projectile. The excavation 3 supplies the space required for the material which has to go somewhere when the supporting body is compressed lengthwise. A recess 4 arranged in the other end of the shoe makes a further compression possible. In the projectile shown in Figure 2, a core 6 is placed in an outer casing 5 so as to rest, in front, against the ogival region of the casing and, behind, against a supporting body 10. This body, shaped according to Figure 1, is here shown in its altered shape after compression in connection with the closing of the outer casing. In order to admit compensation not only for deviations giving the core a greater length than intended, but also for deviations reducing the length of the core, the supporting body must be given a length slightly exceeding the value corresponding to its normal length. The dotted lines 7 and 13 in Figure 2 indicate the sizes of the cavities in a supporting body which has been heavily compressed consequentially to the length of the core exceeding considerably the normal dimension, while the dotted lines 9 and 11 indicate the sizes of the cavities where the length of the core is considerably less than the normal value. The full-drawn contour lines 8 and 12, on the other hand, indicate the shape of the supporting body where there are no or only insignificant deviations from the normal dimensions

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of the core. To effect the compression of the supporting body while the projectile is being closed, a plunger with a cup-shaped concavity may be recommended.

5 The recesses 3 and 4 in the supporting body according to Figure 1 may conveniently be achieved by pressing, a method essentially simplifying the manufacture. According to the invention, however, it is not necessary to arrange the recesses in the ends of the supporting body, or to give them the shapes shown in the figures. A high degree of compressibility in the supporting body can be effected by lateral indentations, or by holes drilled radially through the body. What is essential, however, in order to ensure a correct distribution of weight within the projectile, is that the cavity or cavities be arranged symmetrically, with regard to shape as well as to position, around the axis of the projectile. It is, besides, possible to use a supporting body which is completely or partly porous, one made of sintered metal powders, for instance.

25 The recesses or cavities mentioned above, according to the invention, enable the shoe to be given such a section, in one or several places, as to reduce the assembling pressure to what is required to secure the tight fitting of the parts to the outer casing and to each other.

As stated already, the invention is not limited to the design shown in Figure 2 referring to a core guided only at its end parts. It may be considered advantageous also in the case of projectiles having a core filling completely the outer casing or provided with a surrounding leaden envelope to a supporting body which, by means of cavities symmetrically arranged around the axis of the projectile has been given an increased compressibility.

The compression of the supporting body will vary from one projectile to another. The

45 difference thus ensuing in the weight distribution is of minor importance, especially if the body is made of so light a material as aluminium.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:

1. A projectile provided with an outer casing in which is inserted a core and with a supporting body placed behind the core, characterized by the fact that the support body consists of a material which is soft in relation to the core material, and is shaped with such cavities as will ensure the required degree of compressibility to afford compensation, when the projectile is being assembled, for reasonable variations from the dimensions prescribed as normal for the parts.

2. Projectile according to claim 1, characterized by the fact that the cavities are arranged symmetrically, with regard to shape as well as to position, around the axis of the projectile.

3. Projectile according to claims 1 or 2, characterized by the fact that the supporting body is designed to serve as a centering medium for the core.

4. Projectile according to any of the preceding claims, characterized by the fact that the supporting body consists of aluminium.

Dated 20th day of April, 1945.

LUMALAMPAN AKTIEBOLAG

by

H. W. DENTON-INGHAM,

Bank Chambers,

329, High Holborn, W.C.1,

and

29, Southampton Buildings, W.C.2.

Agent for the Applicants.

*[This Drawing is a reproduction of the Original on a reduced scale.]*

FIG. 1

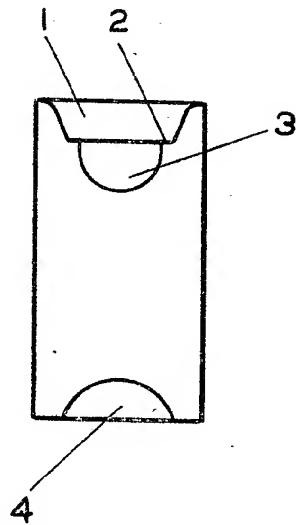


FIG. 2

